WHAT IS CLAIMED IS:

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A method of transmitting data from a transmitter to a receiver, including the steps of:

providing successive sequences of a plurality of modulation symbols for the data,

providing successive sequences of a plurality of spreading codes for the data ,

each individual one of the sequences of the spreading codes for the data being juxtaposed to an individual one of the sequences of the modulations for the data,

providing a parallel presentation of each individual one of the sequences of modulations for the data and the juxtaposed one of the sequences of spreading codes for the data, and

selecting an individual one of the modulations for the data in each sequence and an individual one of the spreading codes in the juxtaposed sequence for the data.

2. A method as set forth in claim 1, including the step of

combining the selected one of the modulations for the data in each sequence and the selected one of the spreading codes for the data in the juxtaposed sequence.

3. A method as set forth in claim 2, including the step of:

transmitting to the receiver the combination of the selected one of the modulations for the

data in each sequence and the selected one of the spreading codes for the data in the juxtaposed sequence.

4. A method as set forth in claim 3 wherein

the modulations are selected from a group consisting of QAM, SQAM and QPSK and wherein

the spreading codes in each sequence are at different rates.

5. A method as set forth in claim 2 wherein

the combination of the selected one of the modulations in each sequence and the selected one of the spreading codes in the juxtaposed sequence constitutes the product of the selected one of the modulations and the selected one of the spreading codes.

6. A method of transmitting information data from a transmitter to a receiver, including the steps of:

providing input signals,

mapping the input signals with a number of binary bits,

modulating the input signals from the mapper with sequences of M modulations,

providing spreading code sequences each having N spreading codes,

the number of binary bits in the mapper providing for a number of different values at least

equal to the product of M and N, and

selecting one of the M modulations in each modulation sequence and one of the N spreading codes in each spreading code sequence.

7. A method as set forth in claim 6, including the step of:

combining the selected one of the M modulations in each modulation sequence and the selected one of the N spreading codes in each spreading code sequence.

8. A method as set forth in claim 6, including the steps of:

multiplying the selected one of the M modulations in each modulation sequence and the selected one of the N spreading factors in each spreading code sequence, and

transmitting the multiplied signals in each sequence to the receiver.

9. A method as set forth in claim 6, including the steps of:

providing alternate ones of the sequences of the M modulations and the sequences of the N spreading codes,

presenting in parallel the M modulations in each modulation sequence and the N spreading codes in the alternate one of the spreading code sequences, and

selecting one of the M modulations and one of the N spreading codes in each parallel presentation.

10. A method as set forth in claim 9, including the steps of:

multiplying the selected one of the M modulations and the selected one of the N spreading factors in each parallel presentation, and

transmitting to the receiver the combination of the selected one of the M modulations and the selected one of the N spreading codes in each parallel presentation.

11. A method as set forth in claim 10 wherein

the M modulations are selected from a group consisting of QAM, SQAM and QPSK modulations and wherein

the N spreading codes in each sequence are at different rates.

12. A method of transmitting information data from a transmitter to a receiver, including the steps of:

providing a channel encoding of the information data,

providing a mapping of the channel encoded data,

providing a plurality of modulations of the mapped data,

providing a plurality of spreading codes,

selecting an individual one of the modulations and an individual one of the spreading codes,

combining the selected one of the data modulations and the selected one of the spreading

codes, and

transmitting the combination of the selected one of the data modulations and the individual one of the spreading codes to the receiver.

13. A method as set forth in claim 12 wherein

the data modulations in the plurality are produced in a sequence and the spreading codes in the plurality are produced in a sequence and wherein

sequences of the data modulations and sequences of the spreading codes are alternately provided and wherein

individual sequences of the data modulations and the alternately provided sequences of the spreading codes are paired in parallel and wherein

an individual one of the data modulations and an individual one of the spreading codes in each parallel pair are selected for combination.

14. A method of transmitting and receiving modulated data, including the steps of:

providing data modulations in sequences each having M different data modulations,

providing spreading codes in sequences each having N different spreading codes, the sequences of the N spreading codes being provided alternately with the sequences of the M data modulations,

selecting an individual one of the M data modulations values in each sequence of the data

modulations,

selecting an individual one of the N spreading codes in each spreading code sequence, and

combining the selected one of the M values in each sequence of the data modulations and the selected one of the N spreading codes in the next alternate of the sequences of the spreading codes.

15. A method as set forth in claim 14 wherein

the combination of the selected one of the M data modulations in each sequence of the data modulations and the selected one of the N spreading codes in the alternate one of the spreading code sequences is transmitted from the transmitter to the receiver.

16. A method as set forth in claim 14, including the steps of:

providing at the receiver stages for receiving successive combinations of the selected one of the M different data modulations in each data modulations sequence and the selected one of the N different spreading codes in each alternate sequence of the spreading codes, and

introducing to the receiver stages the received combinations of the selected one of the M data modulations values in each sequence of the data modulations and the selected one of the N spreading codes in each alternate sequence of the spreading codes to obtain an identification of the received combinations.

17. A method as set forth in claim 16, including the step of:

demodulating the data modulations in each received combination after the identification of the received combination.

18. A method as set forth in claim 16, the step of:

despreading the spreading code in each received combination after the identification of the received combination.

19. A method as set forth in claim 16 wherein

each combination of the data modulation and the spreading code is subjected to correlation factors to identify the combination and wherein

the spreading code in each received combination is despread after the identification of the received combination and wherein

each received combination of the modulated data and the spreading code is demodulated after being despread.

20. A method as set forth in claim 18 wherein

each combination of the selected data modulation and the selected spreading code is passed through a plurality of matching filters, each having individual characteristics, to identify the characteristics of the combination in accordance with the characteristics of the filter through

which the combination passes and wherein

the spreading code in each received combination is despread after the identification of the combination and wherein

each received combination of the data modulation and the spreading code is demodulated after being despread.

21. In a method of receiving and processing data from a transmitter, the steps of:

receiving at a receiver signals transmitted from the transmitter and constituting a combination of a selected one of M data modulations in a data modulation sequence and a selected one of N spreading codes in a spreading code sequence,

identifying, from the different combinations of the M available data modulations in the data modulation sequence and the N available spreading codes in the spreading code sequence, the selected one of the M data modulations in the data modulation sequence and the selected one of the N spreading codes in the spreading code sequence, and

despreading and demodulating the combination of the selected one of the M data modulations in the data modulation sequence and the selected one of the N spreading codes in the spreading code sequence.

22. In a method as set forth in claim 21 wherein

correlation techniques are used to identify, from the different ones of the M data modulations in the data modulation sequence and the different ones of the N spreading codes in the spreading code sequence, the combination of the selected one of the M data modulations in the modulation sequence and the selected one of the N spreading codes in the spreading code sequence.

23. In a method as set forth in claim 21 wherein

matched filter techniques are used to identify, from the different ones of the M data modulations in the data modulation sequence and the different ones of the N spreading codes in the spreading code sequence, the selected one of the M data modulations in the data modulation sequence and the selected of the N spreading code in the spreading code sequence.

24. In a method as set forth in claim 22 wherein

in the correlation technique, the received data is multiplied by each individual one of the N spreading codes and wherein

the individual ones of the products are integrated with time and wherein

the individual ones of the integrated products are squared and wherein

the combination of the selected one of the M data modulations in each data modulation data sequence and the selected one of the M spreading code in each spreading code sequence is identified by the highest value in the squaring of the integrated products.

25. A method of transmitting data from a transmitter to a receiver, including the steps of:

encoding data in accordance with instructions from the receiver,

puncturing the data in accordance with instructions from the receiver,

interleaving the punctured data,

modulating the interleaved punctured data in accordance with instructions from the receiver,

spreading the modulated interleaved punctured data by a particular spreading code in accordance with instructions from the receiver, and

transmitting to the receiver the modulated interleaved punctured data spread by the particular spreading code.

26. A method as set forth in claim 25 wherein

the modulations are in sequences with M data modulations in each modulation sequence and wherein

the spreading codes are in sequences each having N spreading codes and wherein

an individual one of the M modulations is selected in each data modulation sequence and wherein

the spreading code sequences alternate with the modulation sequences and wherein

an individual one of the N spreading codes is selected in each spreading code sequence and wherein

the selected one of the M data modulations in each modulated data sequence and the selected one of the N spreading codes in each spreading code sequence are combined and wherein

the combination of the selected one of the M data modulations in each data modulation sequence and the selected one of the N spreading codes in each alternate spreading code sequence are transmitted to the receiver.

27. A method as set forth in claim 26 wherein

the combination of the selected one of the M data modulations in each data modulation sequence and the selected one of the N spreading codes in each alternate spreading code sequence is provided by multiplying the selected one of the M data modulations and the selected one of the N spreading codes.

28. A method as set forth in claim 26 wherein

the M data modulations in each data modulation sequence and the N spreading codes in each alternate spreading code sequence are provided in parallel and wherein

the selected one of the M data modulations and the selected one of the N spreading codes are selected with the M data modulations and the N spreading codes in parallel.

29. A method of transmitting data and receiving the data at a receiver, including the steps of:

providing the data at the transmitter,

providing a sequence of M data modulations in accordance with instructions from the receiver,

providing a sequence of N spreading codes in accordance with instructions from the receiver,

alternately providing the sequences of the M data modulations and the sequences of the N spreading codes,

pairing in parallel successive ones of the sequences of the M data modulations and the alternate sequences of the N spreading codes,

selecting from each parallel pair an individual one of the M data modulations and an individual one of the N spreading codes,

combining the selected one of the M data modulations and the selected one of the N spreading codes in each parallel pair, and

transmitting to the receiver the combination of the selected one of the M data modulations and the selected one of the N spreading codes in each parallel pair.

30. A method as set forth in claim 29, including the steps of

receiving at the receiver the combination of the selected one of the M data modulations and the selected one of the N spreading codes in each parallel pair, and

identifying the combination of the selected one of the M data modulations and the selected one of the N spreading codes in each parallel pair.

31. A method as set forth in claim 30, including the step of:

demodulating at the receiver the selected one of the M data modulations , in each identified combination, in accordance with instructions from the receiver, to recover the data in the combination.

32. A method as set forth in claim 30, including the step of:

despreading at the receiver the individual one of the N spreading codes in each identified combination, in accordance with instructions from the receiver, to recover the data in the combination.

33. A method as set forth in claim 29, including the step of:

encoding the data at the transmitter, in accordance with instructions from the receiver, before the data is modulated.

34. A method as set forth in claim 30, including the steps of,

encoding the data at the transmitter, in accordance with instructions from the receiver, before the data is modulated and is provided with the spreading code, and

decoding the received combination of the selected one of the M data modulations and the selected one of the N spreading codes in each parallel pair after the demodulation and despreading of the data.

35. A method as set forth in claim 29, including the step of:

puncturing the data at the transmitter, in accordance with instructions from the receiver, before the data is modulated and provided with the spreading code.

36. A method as set forth in claim 29, including the step of:

puncturing the data at the transmitter, in accordance with instructions from the receiver, to delete particular data before the data is modulated and provided with the spreading code, and

depuncturing the data at the receiver, in accordance with the instructions from the receiver, to restore the data punctured at the transmitter.

37. A method as set forth in claim 30, including the steps of:

puncturing the data at the transmitter in accordance with instructions from the receiver, to delete particular data before the data is modulated and provided with a spreading code,

despreading at the receiver the identified combination in each parallel pair of the selected one of the M data modulations and the selected one of the N spreading codes in each parallel pair,

demodulating at the receiver the despread data at the receiver, and

re-inserting at the receiver the punctured data into the demodulated data to recover the data.

38. A method as set forth in claim 29, including the steps of:

puncturing the data at the transmitter, in accordance with instructions from the receiver, before the data is modulated and provided with the spreading code, and

interleaving the punctured data at the transmitter before the data is modulated and provided with the spreading code.

39. A method as set forth in claim 30, including the steps of;

puncturing the data at the transmitter, in accordance with instructions from the receiver, to delete particular data before the data is modulated and is provided with the spreading code,

interleaving the punctured data at the transmitter before the data is modulated and provided with the spreading code and after the data is punctured,

de-interleaving the punctured data at the receiver after the selected one of the M data modulations and the selected one of the M spreading codes in each parallel pair has been identified,

re-inserting the punctured data, in accordance with the instructions from the receiver, before the decoding of the data but after the de-interleaving of the data.

40. A method as set forth in claim 39, including the steps of:

despreading at the receiver the selected one of the N spreading codes in each identified combination, in accordance with instructions from the receiver, to recover the data in the combination, and

demodulating at the receiver the selected one of the M data modulations in each identified combination, in accordance with instructions from the receiver, to recover the data in the combination.

41. In a method of receiving and processing data from a transmitter, the steps of:

receiving at a receiver from the transmitter modulated interleaved punctured data, spread by a particular spreading code, received by the receiver from the transmitter,

de-spreading the received data in accordance with instructions provided by the receiver to the transmitter to obtain the spreading of the data at the transmitter,

demodulating the modulated data in accordance with instructions provided by the receiver to the transmitter to modulate the data at the transmitter,

de-interleaving the demodulated data,

re-inserting the punctured data into the de-interleaved data in accordance with instructions provided by the receiver to the transmitter to obtain the puncturing of the data at the transmitter, and

decoding the data, after the re-insertion of the punctured data into the de-interleaved data in accordance with instructions provided by the receiver to the transmitter, to recover the data.

42. In a method as set forth in claim 41 wherein the data received at the receiver from the transmitter constitutes a combination of a selected one of M data modulations values in a data modulation sequence and a selected one of N spreading codes in a spreading code sequence, the step of:

identifying, from the M data modulations in each data modulation sequence and the N spreading codes in each spreading code sequence, the selected one of the M data modulations in the data modulation sequence and the selected one of the N spreading codes in the spreading code sequence, the identification occurring before the demodulation and the de-spreading of the received data.

43. In combination in apparatus for transmitting data from a transmitter to a receiver,

a bus for providing successive sequences of M data modulations and N spreading codes,

a converter for converting each of the successive sequences of the M data modulations and the N spreading codes to a parallel presentation of the M data modulations in each sequence and the N spreading codes in the juxtapose sequence,

a first selector for selecting an individual one of the M data modulations in each of the parallel presentations,

a second selector for selecting an individual one of the N spreading codes in each of the parallel presentations,

a multiplier for combining the individual one of the M data modulations in each parallel presentation and the individual one of the N spreading codes in the parallel presentation,

a transmitter for transmitting the combination of the selected one of the M data modulations and the selected one of the spreading codes in each of the parallel presentations.

44. In a combination as set forth in claim 43,

an encoder for encoding the successive sequences of the data before the modulation of the data with the M modulations and before the spreading of the modulated data with the N spreading codes,

the converter being responsive to successive coded sequences of the M data modulations and the N spread codes.

45. In a combination s set forth in claim 43,

an interleaver for interleaving the encoded data.

46. In a combination as set forth in claim 43,

the stage for puncturing the data in the successive sequences in accordance with instructions from the receiver before the introduction of the M modulations and the N spreading codes to the data.

47. In a combination as set forth in claim 43,

the M data modulations introduced to the converter in each sequence being provided in accordance with instructions from the receiver,

the N spreading codes introduced to the receiver in each sequence being provided in accordance with instructions from the receiver.

48. In a combination as set forth in claim 43,

a stage for interleaving the data in the successive sequences in accordance with instructions from the receiver before the introduction of the M modulations and the N spread codes to the data.

49. In a combination as set forth in claim 43,

the modulator modulating the data with sequences of M data modulations in accordance with instructions from the receiver,

the code spreader spreading the data in accordance with sequences of N spreading codes in accordance with instructions from the receiver,

the modulator and the code spreader being operative before the selecting operations provided by the first and second selectors.

50. In a combination as set forth in claim 44,

a stage for puncturing the data in the successive sequences before the introduction of the M modulations and the N spreading codes to the data,

a stage for interleaving the data in the successive sequences before the introduction of the M modulations and the N spreading codes to the data,

a modulator for modulating the data with sequences of M modulations in accordance with instructions from the receiver,

a code spreader for spreading the data in accordance with sequences of M spread codes in accordance with instructions from the receiver,

the modulator and the code spreader being operative before the selecting operations provided the first and second selectors, and

a transmitter for transmitting the combination of the selected one of the M data modulations and the selected one of the N spreading codes in each of the successive sequences.

51. Apparatus for transmitting data from a transmitter to a receiver, including,

an encoder for providing coded channels identifying relative locations of the data,

a modulator for providing sequences of M data modulations in accordance with instructions from the receiver,

a code spreader for providing sequences of N spreading codes in accordance with instructions from the receiver,

a converter for converting each of successive encoded sequences of the M modulated data and the juxtaposed sequence of the N spreading codes to a parallel relationship,

as first selector of an individual one of the M modulated data in each sequence,

a second selector of an individual one of the N spreading codes in the juxtaposed sequence, and

a stage for combining the selected one of the M data modulations in each sequence and the selected one of the N spreading codes in the juxtaposed sequence to produce resultant

signal, and

a stage for transmitting the resultant signal in each sequence to the receiver.

52. Apparatus as set forth in claim 51, including

a stage for removing particular ones of the data sequences, before the modulation of the data with the M data modulations and before the spreading of the data in accordance with the N spreading codes, in accordance with instructions from the receiver.

53. Apparatus as set forth in claim 51, including,

a stage for interleaving the data in the sequences before the modulation of the data with the M data modulations and before the spreading of the data in accordance with the N spreading codes.

54. Apparatus as set forth in claim 51, including,

a converter for converting the M data modulations in each sequence and the M spreading codes in the juxtaposed sequence to a parallel presentation,

the first and second selector, being operative after the conversion of the M data modulations in each sequence and the conversion of the N spreading codes in the juxtaposed sequence to the parallel presentation.

55. Apparatus for providing a transmission of data from a transmitter to a receiver, including

a bus for providing data,

a modulator for modulating the data with sequences of M data modulations, and

a spreader for spreading the modulated data with sequences of M spreading codes,

a converter for converting the M data modulations in each sequence and the N spreading codes in the juxtaposed sequence to a parallel presentation,

a first selector for selecting an individual one of the M data modulations in each parallel presentation,

a second selector for selecting an individual of the N spreading codes in each parallel ion, and

a stage for combining the selected one of the data modulation in each parallel presentation and the selected one of the N spreading codes in the parallel presentation.

56. Apparatus as set forth in claim 55 wherein

the M data modulations in each sequence are provided in accordance with instructions from the receiver and wherein

the N spreading codes in each juxtaposed sequence are provided in accordance with instructions from the receiver.

57. Apparatus as set forth in claim 55, including

a transmitter for transmitting to the receiver the combination of the selected one of the M data modulations and the selected one of the N spreading codes in each parallel presentation.

58. Apparatus as set forth in claim 55 wherein

a puncturer is provided to remove data in the sequences, before the modulation of the data with the M data modulations in each sequence and before the spreading of the data with the N spreading codes in the juxtaposed sequence, in accordance with instructions from the receiver.

59. Apparatus as set forth in claim 55 wherein

an encoder provides channel coding to the data in the sequences before the modulation of the data with the M modulations and before the spreading of the data with the N spreading codes.

60. Apparatus as set forth in claim 55 wherein

the M data modulations in each sequence are provided in accordance with instructions from the receiver and wherein

the N spreading codes in each sequence are provided in accordance with instructions from the receiver and wherein

a puncturer is provided to remove data in the sequences, before the modulation of the data in each sequence with the M data modulations and before the spreading of the data in the

juxtaposed sequence with the N spreading codes, in accordance with instructions from the receiver and wherein

an encoder provides channel coding to the data in the sequences before the modulation of the data in each sequence with the M data modulations and before the spreading of the data in the juxtaposed sequence with the N spreading codes.

61. Apparatus for receiving and processing data from a transmitter, including

a bus for receiving transmitted data representing a combination of an individual one of M data modulations in a sequence and N spreading codes in a sequence juxtaposed to the sequence of the M data modulations,

a plurality of filters disposed in a parallel relationship, each of the filters providing characteristics corresponding to a combination of a selective one of the M data modulations and a selective one of the N spreading codes and each operative to receive the data on the bus and to provide an output dependent upon the matching between the characteristics of the filter and the characteristics of the data on the bus, and

a comparator responsive to the output of the matched filters for comparing the magnitude of the outputs from the matched filters in the plurality to select the output with the highest magnitude.

62. Apparatus as set forth in claim 61 wherein the data has been spread by N spreading codes in accordance with instructions from the receiver; the apparatus including:

a de-spreader at the receiver for removing the spreading codes in the data.

63. Apparatus as set forth in claim 61 wherein the data has been modulated by M data modulations in accordance with instructions from the receiver, the apparatus including:

a demodulator at the receiver for removing the modulations in the data modulation.

64. Apparatus as set forth in claim 61 wherein the data has been punctured in a particular pattern at the transmitter, in accordance with instructions from the receiver, to eliminate portions of the data, the apparatus including:

a de-puncturer for restoring at the receiver the portions of the data eliminated at the transmitter.

65. Apparatus as set forth in claim 61 wherein the data has been interleaved at the transmitter,

the apparatus including

a de-interleaver for de-interleaving the data.

66. Apparatus as set forth in claim 61 wherein the data has been encoded at the transmitter to identify the channels in which the data is provided:

the apparatus including:

a decoder at the receiver for eliminating the channel coding.

67. Apparatus as set forth in claim 62 wherein the data has been modulated at the transmitter by M data modulations in accordance with instructions from the receiver and wherein the data has been interleaved at the transmitter and wherein the data has been punctured at the transmitter in accordance with instructions from the receiver,

a demodulator at the receiver for demodulating the M data modulations,

a de-interleaver at the receiver for de-interleaving the data,

a de-puncturer at the receiver for depuncturing the data, and

a decoder for at the receiver for decoding the encoded data.

68. Apparatus for receiving data from a transmitter, including

a bus for receiving transmitted data representing a combination of an individual one of M data modulations in a sequence and N spreading codes in a juxtaposed sequence,

a plurality of multipliers each constructed to combine the transmitted data and an individual of the data codes to provide an output representative of the combination,

a plurality of integrators each operatively coupled to an individual one of the multipliers, to integrate over a particular period of time the output from an individual one of the multipliers,

a plurality of squaring stages each operatively coupled to an individual one of the integrators for squaring the output of the individual one of the integrators, and

a comparator responsive to the outputs of the squaring stages for selecting the individual one of the squaring stages with the largest output and operatively coupled to the integrators for selecting for its output the output of the individual one of the integrators operatively connected to the individual one of the squaring stages.

69. Apparatus as set forth in claim 68 wherein the data has been spread by N spreading codes in accordance with instructions from the receiver; the apparatus including:

a de-spreader for restoring the data to the form at the transmitter before the spreading at the transmitter by the N spreading codes.

70. Apparatus as set forth in claim 68 wherein the data has been modulated by M data modulations in accordance with instructions from the receiver, the apparatus including:

a demodulator for restoring the data to the form at the transmitter before the modulation at the transmitter by the M data modulations.

71. Apparatus as set forth in claim 68 wherein the data has been punctured in a particular pattern at the transmitter, in accordance with instructions from the receiver, to eliminate portions of the data, the apparatus including:

a de-puncturer for restoring at the receiver the portions of the data eliminated at the transmitter.

72. Apparatus as set forth in claim 68 wherein the data has been interleaved at the transmitter,

the apparatus including

a de-interleaver for returning the data at the receiver to the form at the transmitter before the interleaving of the data.

73. Apparatus as set forth in claim 62 wherein the data has been encoded at the transmitter to identify the channels in which the data appears:

the apparatus including:

a decoder for returning the data at the receiver to the form at the transmitter before the encoding of the data by the encoder.

74. Apparatus as set forth in claim 69 wherein the data has been modulated at the transmitter in accordance with instructions from the receiver and has been interleaved at the transmitter and has been punctured with a particular pattern at the transmitter, in accordance with instructions from the receiver, to eliminate portions of the data and has been encoded at the transmitter, in accordance with instructions from the receiver, to identify channels in which the data is provided, the apparatus including:

a demodulator at the receiver for restoring the data to the form at the transmitter before the modulation at the transmitter by the M data modulations,

a de-interleaver at the receiver for returning the data at the receiver to the form at the transmitter before the interleaving of the data,

a de-puncturer at the receiver for restoring at the receiver the portions of the data eliminated at the transmitter, and

a decoder for returning the data at the receiver to the form at the transmitter before the encoding of the data by the encoder.